

Diseases

related to water and sanitation



WaterAid/Jeremy Horner

In the developing world 1.1 billion people do not have access to safe water and 2.6 billion lack adequate sanitation. As a result, water-related diseases are easily spread, with debilitating effects that keep adults out of productive work and children out of school. The weakest members of communities are the most vulnerable, with water-related diseases claiming the lives of 5000 children a day. This makes them the second biggest killer of children worldwide, after acute respiratory infections like tuberculosis.

This information sheet outlines the most prevalent of these diseases. It explains what they are, how they are spread and how they can be prevented. WaterAid's work providing clean water, effective sanitation and good hygiene is designed to dramatically reduce the spread of diseases, particularly by stopping people ingesting the pathogens found in human faecal matter.

Water-related diseases

Unsafe water sources can harbour deadly pathogens.



WaterAid/Jon Spaul

The main water and sanitation related diseases can be divided into three groups – diarrhoeal diseases, diseases caused by worms and water washed diseases. All of these are caused by the spread of micro-organisms called pathogens, which include viruses, bacteria, protozoa and helminths (parasitic worms). In environments where there is poor hygiene, open defecation and/or unsafe water, pathogens can easily be spread around a community. While not classified as a water and sanitation related disease, malaria is also exacerbated by these conditions.

Diarrhoeal diseases

Diarrhoeal diseases are the most deadly of the water and sanitation diseases killing over two million people every year - mostly children under the age of five. There are approximately four billion cases of diarrhoea each year which are caused by more than 100 different bacteria or viruses.

Diarrhoea causes the rapid depletion of water and sodium in the sufferer. If more than 10% of the body's fluid is lost the sufferer dies. Children who are malnourished suffer the most, becoming even weaker and more malnourished as diarrhoea progresses. 50% of deaths from diarrhoea are from acute watery diarrhoea (including cholera) where the sufferer cannot be rehydrated, 35% are through persistent diarrhoea (lasting 14 days or longer) and 15% through dysentery (or bloody diarrhoea).



Rotavirus (also known as infantile diarrhoea or winter diarrhoea) is the leading viral cause of severe diarrhoea and vomiting in children, particularly in the developing world, killing over 600,000 children a year. This wheel-like virus is highly infectious and spreads when children are exposed to contaminated water, food or faecal matter.

Sufferers experience a mild fever, followed by vomiting and stomach cramps signifying the onset of diarrhoea. Other symptoms include dryness of the lips, tongue and skin and sunken eyes.



Cholera is a bacterial disease that can cause large epidemics killing the young, the weak and the old. The bacteria are spread by contaminated water and food and occasionally by person to person contact.

Sudden large outbreaks are usually caused by water supplies becoming contaminated with human waste.

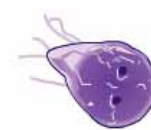
The bacteria attaches to the wall of the small intestine where it multiplies and produces a poisonous chemical. This poison prevents the body from taking water from the intestine and so the body rapidly dehydrates. Up to 14 litres of diarrhoea can be passed in one day. The lack of water in the body causes the blood pressure to drop and the kidneys to fail. Death occurs within 24 hours.

Bacillary dysentery infects 140 million people each year, resulting in around 300,000 deaths. It is caused by Shigella bacteria, which are spread by contaminated drinking water, food or flies and between people.

It infects the large intestine and symptoms can include fever, abdominal pain, nausea, cramping and severe, frequent, watery diarrhoea that can contain blood, mucus and pus.

Typhoid fever affects 17 million people worldwide every year, with approximately 600,000 deaths. It is contracted when people drink water or eat food infected with the Salmonella typhi bacteria found in human waste.

Typhoid fever is characterised by the sudden onset of sustained fever, severe headache, nausea and constipation. Later it is accompanied by diarrhoea, a rash and other complications which can include intestinal haemorrhaging or perforation.



Giardia is a protozoan infection that normally produces a mild bowel infection, with symptoms of nausea, vomiting, diarrhoea, malaise, and poor appetite. However, in developing countries, where people have nutrient-poor diets, it can become chronic, suppressing adequate calorie intake and leading to weight loss, and in some cases death.

Prevention of diarrhoeal diseases

These diseases can be reduced by improving access to clean water supplies and sanitation. Good sanitation means that human waste, which contains many pathogens, is safely disposed of, so it cannot be spread around communities,

causing contamination of food or drinking water. Hygiene education is also necessary to ensure communities are aware of the importance of using latrines safely; washing their hands with soap, particularly after visiting a latrine or before eating; storing food and water safely and keeping their environment clean.

The simple act of washing hands with soap and water can reduce diarrhoeal diseases by over 40%.



WaterAid/Suzanne Porter

Diseases caused by helminths (worms)



Bilharzia is a disease caused by a small flat worm which lives in the veins of pelvic organs. Over 200 million people are infected and the disease causes 20,000 deaths a year.

Following a life cycle stage in certain types of water snails this parasitic worm penetrates the skin and travels to the blood vessels of the liver, intestine and bladder where they mature. Fever, malaise, nausea and diarrhoea follow with liver failure, neurological problems and even death in the advanced stages if left untreated.

Prevention: Bilharzia can be prevented through the use of latrines which stop the eggs getting into water sources, discouraging people from bathing in infected lakes or streams, using a safe drinking water supply and snail eradication programmes.



Guinea worm is a parasitic disease that enters the human body through drinking contaminated water. The guinea worm grows up to one metre long and lives under the skin. It can be spread when the sufferer puts the infected area of skin in water, allowing larvae back in to the drinking water cycle.

The worm causes severe pain and eventually emerges through the skin leading to ulcers, fevers and other ailments.

Prevention: Guinea worm can be prevented through using safe drinking water, or filtering unsafe water through a fine nylon mesh, and hygiene education which includes encouraging infected people to stop entering the water sources. Following mass awareness campaigns, the global incidence of the disease has fallen from 3.5 million cases in 1986 to just over 10,000 in 2005, with hopes it will be eradicated completely by 2009. Most remaining cases are in Sudan, where civil war has slowed progress.

Hookworms are a very common intestinal parasite which grow up to 1cm long and 4mm wide. They are spread when larvae enter the skin, typically through the soles of feet when people walk barefoot. 900 million people are affected worldwide. The eggs, which are passed out in human faeces, can survive for up to three months in the soil.

The worm lives in the small intestine and attaches itself to the intestine walls using hooks on its head. Damage to the intestinal wall reduces the body's ability to absorb food. Hookworms result in stunted growth in children, loss of blood and anaemia. In severe cases anaemia can cause heart failure.

Prevention: Hookworms can be prevented by the use of sanitary latrines. Wearing shoes or sandals to prevent the worms from penetrating the skin is also very important.

Water washed diseases

Water washed diseases are caused by water scarcity where people cannot wash themselves, their clothes or home regularly.

Trachoma is the main cause of preventable blindness in the developing world, with four million sufferers, an estimated 500 million at risk and six million permanently blinded. It is common in areas that are hot, dry and dusty and where there is not enough water for people to wash regularly.

Trachoma is spread, especially among young children, by flies, fingers and clothing coming into contact with infected eyes, spreading the infection to other people's eyes.

The infection causes a sticky eye discharge with soreness and swelling of the eyelids. After repeated infections scarring of the inner eyelids occurs which can lead to trichiasis where the eyelashes turn inwards. These then rub on the eye, scarring the cornea and causing blindness.

Prevention: Trachoma can be prevented through regular hand and face washing with a good supply of clean water, along with hygiene education to help prevent flies from breeding.

Scabies occurs in areas where there is a lack of water and people are unable to wash themselves, their clothes, bedclothes or houses regularly. It is caused by the scabies mite which infests the surface layer of the skin. The mite can spread from one person to another through personal contact.

Scabies causes itchy sores and lesions mainly between the fingers, wrists, elbows, breasts and pubic areas. In younger sufferers more areas, including a baby's feet and head, can be infected. Because sufferers often scratch the sores and lesions they become prone to other infections.

Prevention: Washing regularly with soap and keeping clothes, bedclothes and houses clean prevents scabies.

Ndasiona, three, from Malawi gets treated with ointment for scabies.



WaterAid/Jon Spaul

Malaria

Malaria is caused by protozoan parasites transmitted from person to person by the female anopheline mosquito. Malaria causes more than 300 million acute illnesses and over one million deaths annually. WaterAid's work helps prevent malaria by preventing the buildup of stagnant wastewater that can act as mosquito breeding grounds, and by establishing safe water sources that mean people spend less time at mosquito ridden traditional water sources such as ponds or swamps.

Factfile

- At any given time almost 50% of people in developing countries are suffering from a health problem caused by water and sanitation deficits
- Children in developing countries commonly carry up to 1000 hookworms, roundworms and whipworms at a time causing anaemia, stunted growth and other debilitating conditions
- One gram of faeces can contain: 10,000,000 viruses, 1,000,000 bacteria, 1000 parasite cysts and 100 parasite eggs
- 443 million school days are lost each year due to water-related diseases

Sources: UNDP Human Development Report 2006, UNICEF State of the World's Children 1998, UNICEF 2000, WHO 2004

A WaterAid hygiene promotion mural on a school latrine block in India.



WaterAid/Marco Betti

37p could pay for a six inch cement sewage pipe in Pakistan

£2.40 constructs a hand-washing facility for ten people in Nigeria

£95 can train 10 community leaders as hygiene educators in India

£268 pays for an Afridev handpump in Ghana

£600 pays for a block of six school latrines in Bamako, Mali

Honufa lives in the overcrowded Outfall Slum in Bangladesh's capital city Dhaka.



WaterAid/Abir Abdullah

Honufa was interviewed in a tiny room with ten women and a health worker. When asked if anyone knew of someone whose child has died, three out of the ten women put their hands up. But it wasn't from second hand experience – each of these women had lost a child due to poor sanitation and unclean water.

"Life is very hard here," Honufa says. "You can see the condition of the houses all crammed together. There is no space and you can imagine the unhealthy situation we live in. We have tubewells but the surrounding area is full of rubbish and the sanitation conditions everywhere are foul. Every day there is disease in this slum. There is diarrhoea, dysentery, severe stomach pains and headaches. Children suffer the most. I've lost a two year old son from diarrhoeal diseases. We need a clean environment here."

Honufa is now part of a group working with WaterAid's partner, PSTC to learn about safe hygiene, water and sanitation.

Nyaama, 56, from the village of Aurigo in the Upper East Region of Ghana was blinded by trachoma.



WaterAid/Jon Spaul

Nyaama has been blind for over 30 years, since she contracted trachoma, an eye disease attributable to the lack of clean water.

"I do not understand exactly why I went blind but I know it was to do with the water here as where I grew up had clean water and I was fine but when I came here and used the dirty water my problems started.

My sight went slowly – for a while I could see in the afternoon but not at night, but now I see nothing. If I hadn't become blind I could have worked like the others who aren't blind and earn money. Now when I go to fetch water a child has to lead me there.

Other people get hernias in their stomachs or diarrhoea because of the water. The most important thing we need in this village is water."

WaterAid is a member of the International Trachoma Initiative, which is dedicated to the elimination of trachoma, the world's leading cause of preventable blindness.



WaterAid – water for life

The UK's only major charity dedicated exclusively to the provision of safe domestic water, sanitation and hygiene education to the world's poorest people.

For further information about WaterAid:
WaterAid, 47-49 Durham Street, London SE11 5JD

www.wateraid.org

T: 020 7793 4500 F: 020 7793 4545
E: wateraid@wateraid.org

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